Names: _____ *Section_____*

Chem 226/ Fall 2004 *Dr. Rusay*

Optical Rotation / Polarimetry Report Form

Refer to Lehman Operation #31

Work in pairs. There will be no need for formal recording in your lab notebook for this experiment. Complete this form and answer the Web questions from the assignmment page, attach and turn-in form. Keep a copy for your records. *http://ep.llnl.gov/msds/orgchem/Chem226/226assign-04.html*

Part I: Optical rotation, optical purity, enantiomeric excess

Olfactory discrimination of enantiomers is possible as you have seen with carvone. In Part I of this experiment you will determine the optical purity of 2 samples of carvone and relate your experimental results to the enantiomer's smell, physical properties and absolute configuration. Each partner should independently determine α for both of the unknown carvone solutions A & B that have been prepared for you. Take the average of the two and then calculate [α] for each of the carvone unknowns. Show your calculations below the Table.

Experimental Data:

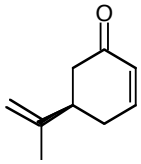
Cell path length = 100. mm	*Temperature* = 25 °C	λ = *589 nm* (sodium D)	*solvent* = ethanol	$\alpha_{solvent}$ =

	Mass (mg)	Volume (mL)	α_1	α_2	α_{avg}	[α] (calc.)	Smell: (mint , caraway or cannot tell)
Unknown A							
Unknown B							

Calculations:

$[\alpha]_A$ = $[\alpha]_B$ =

Consult the chemical literature and complete the following table of physical/ optical data for the carvone enantiomers. (To detemine the absolute configurations (R- or S-) refer to the structure below of d-carvone.)



	boiling point	density	[α]	Abs. Config.
d-carvone				
l-carvone				

Using the literature and experimental data complete the following questions for the unknowns A and B. Show your calculations for optical purity and enamtiomeric excess.

	optical purity	% R-	% S-	Enantiomeric Excess: (%) *indicate* *d*- or *l*-	Smell
Unknown A					
Unknown B					

Calculations:

Optical Purity A

Optical Purity B

Enantiomeric Excess A

Enantiomeric Excess B

A) Are the observed smells consistent with your results? Briefly discuss.

B) The LD_{50} for racemic carvone is reported as 1640 mg/kg . 1) Is carvone considered toxic? 2) How much would be toxic to the lighter 50% of your group? 3) Would you expect this value to be the same for each enantiomer? Briefly explain your answer.

In Part II, you will examine several chiral molecules whose olfactory properties have been studied. Refer to the Web molecules. Identify each of the compounds which come from the abstracts and list in the handout: M. Laska and P. Teubner, *Chemical Senses*, 24, 161-170 (1999) and M. Laska, *Chemical Senses*, 29, 143-152 (2004).